

A great option for students double-majoring in **Computer Science** or **Data Science**!

The **Mathematical Sciences Program** is designed to provide broad training in basic mathematics together with some specialization in an area of application of mathematics. Each student must select one of the eight Program Options as a special area. Because the program options have somewhat more specific requirements, careful planning and frequent consultation with your advisor are essential to ensure timely completion of the program. The concentration program must include at least nine courses: four basic courses (II.), three courses from one of the Program Options (III.), and two additional courses (IV.) as described below. At least two of the five (optional and additional) courses must be MATH courses.

I. Prerequisites (3 courses) {must be completed with C- or better}**

Instructions	Course(s)	Student Elections (enter your course selections here)
Select one of the following course pairs :	Math 215 & 217 Math 285 & 217 Math 205 & 217 Math 295 & 296	1. _____ 2. _____
EECS 183 or working knowledge of a high-level computer language (Fortran, C, or C++)	EECS 183 or working knowledge of a high-level computer language (Fortran, C, or C++) *Students are strongly encouraged to take EECS 280 and EECS 281 as well.	3. _____

II. Basic Courses (4 courses) {must be completed with C- or better}**

Instructions	Course(s)	Student Elections (enter your course selections here)
Select one of the following Differential Equations courses:	Math 316 Math 286	1. _____
Select one of the following Discrete Math/Modern Algebra courses:	Math 312 Math 465 Math 412 Math 493	2. _____
Select one of the following Analysis courses:	Math 351 Math 354 Math 451 Math 450 Math 454	3. _____
Select one of the following Probability courses:	Math 425 Math 525	4. _____

** More advanced students, such as those who have completed Math 396, may substitute higher-level courses with the approval of a concentration advisor. All students are strongly encouraged to include in their program one of the more theoretical courses: Math 412, 451, 493, 494, or 525.

III. Program Options: Discrete and Algorithmic Methods (3 courses)

A student in the **Mathematical Sciences Program** must choose one of the eight options and complete at least three courses listed under that option. This requirement is designed to provide focus and depth to the program and can only be waived by a departmental advisor in favor of a program that provides this depth in some equivalent way. An acceptable program must include some of the more difficult courses. Advice should be sought from a departmental advisor before selecting an option.

Discrete and algorithmic methods are concerned with the analysis of finite structures such as graphs, networks, codes, incidence structures, and combinatorial structures. The rapid growth of this area has been driven largely by its role as the mathematical core of computer science. Typical problems of this field involve optimization, emulation, or probabilistic estimation.

Instructions	Course(s)	Student Elections (enter your course selections here)	
Select three of the following courses:	Math 416 - Theory of Algorithms Math 420 - Adv Linear Algebra Math 465 - Intro to Combntcrs Math 475 - Elem Number Theory Math 481 - Intro to Math Logic Math 561 - Linear Prog I Math 565 - Comb & Graph Theory Math 566 - Combinatorial Thry Math 567 - Intro Coding Theory	Math 575 - Intro Thry Numbers EECS 376 - Found. of Comp Sci. EECS 445 - Intro Machine Lrng EECS 475 - Intro Cryptography EECS 477 - Intro to Algorithms EECS 550 - Information Theory EECS 574 - Comput Complexity EECS 586 - Design/Analysis. Algorithms EECS 587 - Parallel Computing IOE 614 - Integer Progmng	1. _____ 2. _____ 3. _____

IV. Advanced Courses (2 courses)

To complete the major program, each student should elect two additional advanced courses in mathematics or a related area. In all cases, **approval from a departmental advisor is required**. This is a very flexible requirement designed to accommodate special interests and may be satisfied by a broad range of courses in other departments (generally numbered 300 or above) or by mathematics courses numbered 400 or above.

Instructions	Course(s)	Student Elections (enter your course selections here)
Select two Advanced courses:	<i>Selected with approval from a mathematical sciences advisor</i>	1. _____ 2. _____

V. Requirements

At least two of the courses in III. and IV. must be MATH courses.

At least one must be a cognate course numbered 300 or above taught outside the department that emphasizes applying significant mathematical tools (at least at the level of Math 215) in another discipline.